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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/533,143	04/27/2005	Seiji Sugiura	TOW-099US	5048

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LAHIVE & COCKFIELD, LLP
FLOOR 30, SUITE 3000
ONE POST OFFICE SQUARE
BOSTON, MA 02109

EXAMINER	
HAN, KWANG S	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
12/23/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/533,143	SUGIURA ET AL.	
	Examiner	Art Unit	
	Kwang Han	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 August 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *9/12/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FUEL CELL

Examiner: K. Han SN: 10/533,143 Art Unit: 1795 December 19, 2008

DETAILED ACTION

1. The Applicant's amendment filed on August 28, 2008 was received. Claim 4 was cancelled. Claims 1 and 5 were amended.

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

4. The claim rejections under 35 U.S.C. 112, second paragraph, on claim 5 are withdrawn, because the claim has been amended.

Claim Rejections - 35 USC § 103

5. The claim rejection under 35 U.S.C. 103(a) as unpatentable over Inoue et al. in view of Sha et al. on claim 4 is withdrawn, because claim 4 has been cancelled.

6. The claim rejection under 35 U.S.C. 103(a) as unpatentable over Inoue et al. in view of Sha et al. on claims 1, 2, 5-7, 10 and 11 is maintained.

Regarding claim 1, Inoue et al is directed to a fuel cell comprised of the following:

- a electrolyte electrode assembly (12) and separators (16) stacked alternately (Figure 1; [33]),
- the electrolyte electrode assembly including a pair of electrodes (20, 22),
- an electrolyte interposed between the electrodes (18),
- a reactant gas passage (36a, 38a) and a reactant gas discharge passage (36b, 38b) extending through the fuel cell in the stacking direction (Figure 1),
- a reactant gas flow field (60, 62) formed for supplying a reactant gas along an electrode surface (Figure 2; [43]),
- the reactant gas flow field including a plurality of serpentine flow grooves having substantially the same length (Figure 3, 4), and
- the flow grooves having an even number of turn regions (Figure 3, 4).

Inoue is silent towards the use of substantially triangular inlet or outlet buffers which are symmetric or buffers which have sides which are substantially perpendicular to the terminal portions of the serpentine flow grooves.

Sha et al. teaches the use of triangular buffers at the inlet and outlet regions of the flow grooves and reactant gas supply passage and with one side (nearest to the edge) on the inlet and outlet buffer that are substantially perpendicular to terminal portions of the flow grooves for the benefit of minimizing stagnation of fluids, allow for

more uniform distribution of fluids, and minimizing contact resistance [48, 49] (Drawings 1, 2, and 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Sha's triangular buffers with sides substantially perpendicular to terminal portions of the flow grooves in Inoue's fuel cell because Sha teaches it for the benefit of a more uniform distribution of gases and minimizing contact resistance.

Regarding claim 2, Sha teaches the use of a plurality of bosses (11a) formed in both the inlet buffer (11) and outlet buffer (12) (Drawing 1).

Regarding claim 5, Inoue is further directed to a fuel cell comprised of the following:

- a fuel gas supply passage (36a),
- an oxygen containing gas supply passage (38a),
- a fuel gas discharge passage (36b),
- an oxygen-containing gas discharge passage (38b),
- a coolant supply passage (40a),
- a coolant discharge passage (40b), and
- these passages are divided evenly (Figure 5), wherein three passages extend on the left end of the separator and three on the right [50].

Regarding claim 6, the teachings of Inoue and Sha as discussed are herein incorporated. Inoue is further directed to a fuel cell wherein a gas flow field (60) is formed on one surface (16a) and a coolant flow field (72a, 72b) is formed on the other surface (16b) of the separator (Figures 2, 5; [42, 44]). Inoue is silent towards the use of a triangular buffer as discussed in claim 1.

Sha et al. teaches the use of triangular buffers at the inlet and outlet regions of the flow grooves and reactant gas supply passage for the benefit of minimizing stagnation of fluids, allow for more uniform distribution of fluids, and minimizing contact resistance [48, 49] (Figure 1, 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Sha's triangular buffers in Inoue's fuel cell's gas/coolant supply passages and the flow fields for the benefit of a more uniform distribution of gases and fluids.

Regarding claim 7, Inoue teaches a fuel cell wherein the reactant flow field (60, 62) includes a flow groove having a curve (Figure 4 and 5, as the channels turn at the bends).

Regarding claim 10, the applicant is directed towards the discussion concerning claim 4.

Regarding claim 11, the applicant is directed towards the discussion concerning claims 5 and 6.

7. The claim rejections under 35 U.S.C. 103(a) as unpatentable over Inoue et al., Sha et al. and Schora et al. on claims 3 and 9 are maintained. The rejection is repeated below for convenience.

Regarding claims 3 and 9, the teachings of Inoue and Sha as discussed above are herein incorporated. Inoue and Sha are silent towards the use of a gas supply and discharge passage which has at least one oblique side.

Schora teaches the use of gas passages (24, 25) for both the supply and discharge (Column 9, Lines 15-19) that has a triangular shape having at least one oblique side for the benefit of an easily formed wet seal area (Column 9, Lines 25-29). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Schora's gas passage in Inoue and Sha's fuel cell for the benefit of providing a gas passage which can more easily form a wet seal area.

8. The claim rejection under 35 U.S.C. 103(a) as unpatentable over Inoue et al., Sha et al. and Kurita et al. on claim 8 is maintained. The rejection is repeated below for convenience.

Regarding claim 8, the teachings of Inoue and Sha as discussed above are herein incorporated. Sha teaches the use of a triangular buffer but is silent towards the use of a substantially rectangular buffer. Inoue teaches stacking of fuel cell units to form a fuel cell stack with opposing separators/metal plates [33].

Kurita teaches the use of plates between fuel cell unit cells that include a substantially rectangular buffer for the benefit of improving the gas passage in a plate between unit cells to enhance gas efficiency (Abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to apply Kurita's plates between the fuel cell unit cells with a rectangular buffer region in Inoue and Sha's fuel cell for the benefit of improving the gas passage between the unit cells.

Response to Arguments

9. Applicant's arguments filed August 28, 2008 have been fully considered but they are not persuasive.

Applicant's principal arguments are:

(a) the triangular flow grooves 11 and 12 of the Sha reference do not have the same size, and thus cannot be symmetrical,

(b) one side of the flow grooves 11 and 12 of the Sha reference are not substantially perpendicular to terminal portions of the serpentine flow grooves,

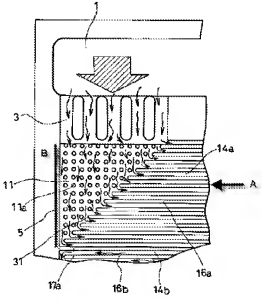
(c) the oblique sides of the reactant gas supply passages of the Sha or Schora reference do not face the oblique side of the flow grooves, and

(d) the combination of Inoue and Sha fail to teach "a buffer with one side connected to the reactant gas supply passage on the one surface of the metal separator, and another side connected to the coolant passage on the other side of the metal separator, and a still another side connected to the reactant gas flow field and the coolant flow field on both surfaces of the metal separator".

In response to Applicant's arguments, please consider the following comments:

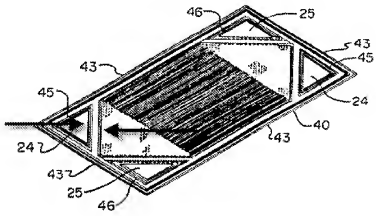
(a) drawing 1 of the Sha reference shows the flow grooves 11 and 12 both having a triangular shape and basically of a inverted mirror image of the opposing side of separator. There is nothing to suggest that the outlet and buffer region of Sha do not have the same or close to the same size to form buffers which are substantially symmetrical as recited in claim 1,

(b) the Sha reference does teach one side of the flow grooves 11,12 being substantially perpendicular to the terminal portions of the serpentine flow grooves as shown below in the figure:



The terminal portions all face in the direction of arrow A which is substantially perpendicular to the side B of the flow groove of Sha.

(c) as previously stated, the gas supply of Sha is silent towards the use of a gas supply passage with an oblique side. The Schora reference does teach that the oblique side of the gas supply passage faces the oblique side of the flow grooves of Schora as shown below in the figure:



As can be seen in the figure the oblique side of the gas supply passage faces the the oblique side of the flow grooves. When applying the teachings of Schora in combination with Sha it would have been obvious to one of ordinary skill in the fuel cell art to maintain or vary the orientation of oblique side of the gas supply passage to face the oblique side of the flow grooves to best direct the gas flow.
(d) the Inoue reference teaches a reactant gas flow field and a coolant flow field connected to the reactant gas and coolant supply passages as discussed above on opposing sides of the separator. In combination with the buffer of Sha, the sides of the buffer on the opposing sides of the separator would be connected to the reactant gas flow field and coolant flow field, meeting the limitations of the claims.

Conclusion

10. **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact/Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kwang Han whose telephone number is (571) 270-5264. The examiner can normally be reached on Monday through Friday 8:00am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. H./
Examiner, Art Unit 1795

/Dah-Wei D. Yuan/
Supervisory Patent Examiner, Art Unit 1795